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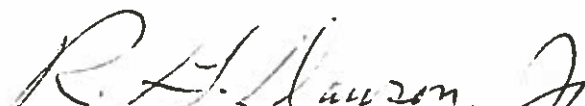
FEASIBILITY STUDY

US 64, Interchange Addition
At SR 1006, Edgecombe County
R-2546

Prepared by
Planning and Research Branch
Division of Highways
N. C. Department of Transportation

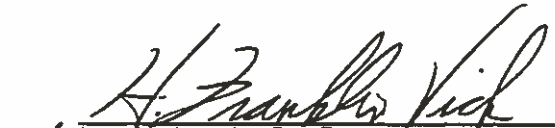


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at SR 1006, Edgecombe County
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DESCRIPTION

This report addresses the feasibility of adding ramps to an existing grade separation to provide a diamond interchange at US 64 and SR 1006. The interchange location is shown on Figure 1. This project is included in the 1990-1996 Transportation Improvement Program for feasibility study and/or right of way protection and is not currently funded.

EXISTING FACILITIES

US 64 Bypass is a major thoroughfare for the Tarboro area and is constructed to freeway standards through the project area. It is part of the North Carolina Intrastate Network. SR 1006 is also a major thoroughfare and is classified as an urban minor arterial in the North Carolina functional classification system. SR 1006 in the project area is a 22-foot, 2-lane paved facility with 10-foot shoulders (3-foot paved and 7-foot grassed).

The bridge over US 64 has 4 percent grades on the north and south approaches yielding a design speed of 45 mph. It has a roadway width of 28 feet and is approximately 260 feet long.

Land development in the project area is light residential, commercial and institutional. North of the studied interchange, six residences would have to be relocated due to the control of access needed on SR 1006. Located just south of US 64 on SR 1006 is the Edgecombe Community College on the east side and a Department of Transportation (DOT) maintenance yard on the west side. One of the driveway entrances to the Community College would have to be closed due to the right-of-way required for the interchange. On the west side of SR 1006, some of the D.O.T.'s maintenance sheds would have to be relocated and, in the north-east quadrant, a small cemetery (approximately 10 graves) would also have to be relocated to allow construction of respective ramps.

INTERCHANGE DESIGN AND COST

The provision of an interchange at US 64 and SR 1006 would retain the existing bridge. However, widening the bridge to accommodate three 12-foot lanes would be necessary to provide for left hand turning movements at the ramp junctions. Ramps would be added in each quadrant resulting in a simple diamond design.

The total estimated cost for an interchange at the project location is \$2,200,000, including \$1,650,000 for construction and \$550,000 for right-of-way. The construction cost includes engineering and contingencies, and the right of way cost includes relocation, acquisition, and utility costs. Cost estimates were prepared by the Preliminary Cost Estimate Engineer and the Right of Way Branch.

INTERCHANGE SPACING, TRAFFIC DATA, AND ECONOMIC ANALYSIS

The studied interchange would be 1.0 mile from the nearest future interchange at SR 1207 to the west and 1.3 miles from the nearest interchange at US 258 to the east. Standards for interchange spacing in a suburban area call for a minimum of two miles with five miles being desirable. In a rural setting, a minimum of three miles is required with eight miles being desirable. The project area is considered rural in nature, but is anticipated to be suburban in the near future.

Estimated turning movements for the studied interchange are shown in Figure 2. Initially, they would range from 600 to 1700 vehicles per day (vpd), increasing to 1000 to 3100 vpd by the year 2010. Traffic on SR 1006 would be 5200 vpd initially, increasing to 10,200 by the year 2010. Traffic on SR 1006 would nearly double as a result of the interchange.

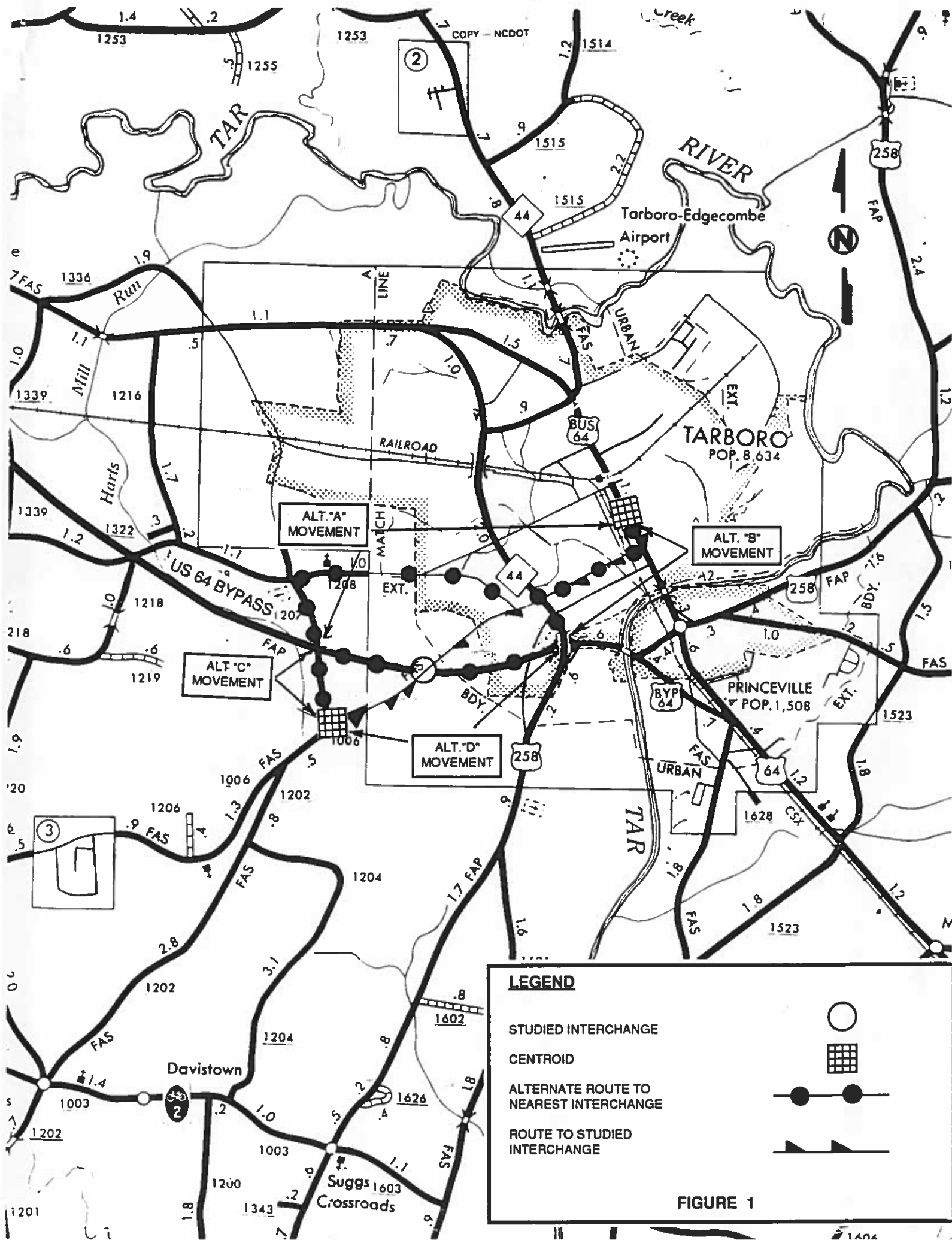
An economic analysis was made to compare the road user savings with the cost of constructing the interchange. Figure 1 shows the routing of traffic with and without the interchange from a centroid on either side of the interchange. The northern centroid is located in downtown Tarboro assuming this is the center of trip production for the area north of the interchange. The southern centroid is located at the intersection of SR 1207 and SR 1006 with the assumption that this is a common point which both alternate movements and movements to the studied interchange would pass through. Based on these centroid locations, a road user savings of \$319,000 per year is calculated (see attached worksheet). With the annual cost of capitalization and maintaining the interchange at \$220,000, the benefit-cost ratio is calculated to be 1.5. Thus, the interchange is theoretically cost effective.

CONCLUSIONS

Although an interchange at SR 1006 would provide additional access to US 64 and enhance development potential, it is not physically or economically a good investment. An interchange at this location has the following disadvantages: (a) it has a low benefit-cost ratio; (b) it does not meet the minimum standards for interchange spacing; (c) it results in relocation of six residences; and (d) it has an adverse effect on the community college, DOT maintenance yard, and the cemetery.

Based on these disadvantages and the availability of nearby alternate access to US 64, the subject interchange is not recommended for construction.

BB/sdt



INTERCHANGE JUSTIFICATION AT SR-1006
BETWEEN SR-1207 AND US-258

EST. 1990/2010 ADT IN HUNDREDS

WITHOUT INTERCHANGE AT SR-1006

		SR-1207		SR-1006		US-158	
		<u>50</u> 96		<u>29</u> 52		<u>81</u> 147	
US-64		<u>31</u> 55	<u>11</u> 18		<u>15</u> 29	<u>35</u> 60	
<u>100</u> 201		<u>13</u> 22	<u>18</u> 30		<u>7</u> 12	<u>15</u> 28	<u>113</u> 219
			85 172		85 172		
		<u>39</u> 75		<u>29</u> 52		<u>53</u> 98	
		TTST = 2%		TTST = 3%		TTST = 2%	
		DUAL = 2%		DUAL = 4%		DUAL = 3%	
		DHV = 10%		DHV = 10%		DHV = 10%	
		DIR = 60%		DIR = 60%		DIR = 60%	

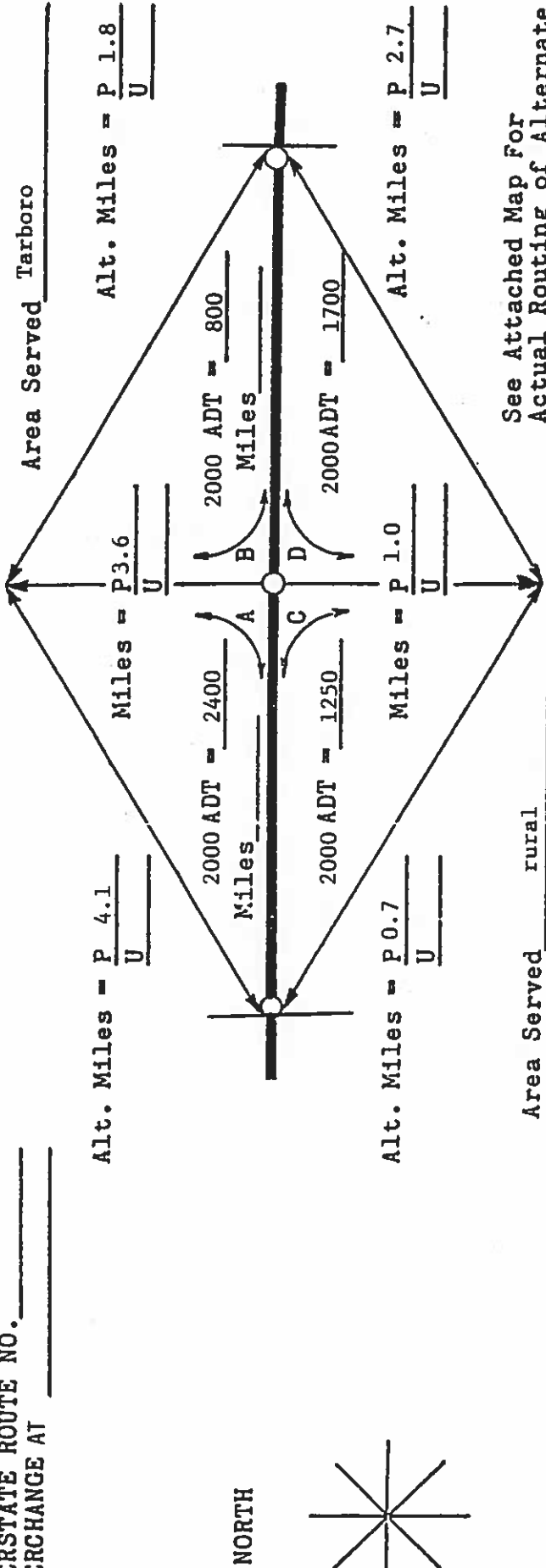
WITH INTERCHANGE AT SR-1006

		SR-1207		SR-1006		US-158	
		<u>37</u> 66		<u>52</u> 102		<u>76</u> 142	
US-64		<u>16</u> 26	<u>7</u> 11	<u>17</u> 31	<u>6</u> 10	<u>13</u> 28	<u>33</u> 57
<u>100</u> 201		<u>5</u> 8	<u>6</u> 11	<u>8</u> 17	<u>11</u> 23	<u>7</u> 12	<u>16</u> 28
			92 189		84 174		
		<u>25</u> 48		<u>48</u> 101		<u>53</u> 97	
		TTST = 2%		TTST = 3%		TTST = 2%	
		DUAL = 2%		DUAL = 4%		DUAL = 3%	
		DHV = 10%		DHV = 10%		DHV = 10%	
		DIR = 60%		DIR = 60%		DIR = 60%	

FIG. 2

WORKSHEET FOR DETERMINING BENEFIT-COST RATIO

INTERSTATE ROUTE NO. _____
INTERCHANGE AT _____



Quad	Without Interchange			With Interchange			Road User Savings
	cost x miles mile	cost x miles mile	cost x net no. stop stops	cost x miles mile	cost x miles mile	Days ADT	
A	$(.35 \times 1.8 + .30 \times 2.3)$	$(.35 \times 2.3)$	$(.07 \times 1.0)$	$(3.5 \times 2.6 + .30 \times 1.0)$	(3.5×2.6)	(2400)	$= \$ 157,700$
B	$(.35 \times 1.8 + .30 \times 2.3)$	$(.35 \times 2.3)$	$(.07 \times 1.0)$	$(3.5 \times 2.6 + .30 \times 1.3)$	(3.5×2.6)	(800)	$= \$ \text{Negative}$
C	$(.35 \times 0.7 + .30 \times 1.25)$	$(.35 \times 1.25)$	$(.07 \times 1.0)$	$(3.5 \times 1.0 + .30 \times 1.0)$	(3.5×1.0)	(1250)	$= \$ \text{Negative}$
D	$(.35 \times 2.7 + .30 \times 1.7)$	$(.35 \times 1.7)$	$(.07 \times 1.0)$	$(3.5 \times 1.0 + .30 \times 1.3)$	(3.5×1.0)	(1700)	$= \$ 161,300$
TOTAL ANNUAL SUM OF ROAD USER SAVINGS							$= \$ 319,000$

Cost of Interchange _____
Annual capitalization and maintenance cost $(\$ 2,200,000 \times 0.10) = \$ 220,000$
Interchange benefit-cost ratio _____
The interchange is ☐ is not ☐ justified based upon benefit-cost ratio 1.5